REMARKS

Favorable reconsideration of this application in view of the remarks to follow is respectfully requested.

Claims 1-2, 4-5, 7-8, and 26 stand rejected under 35 U.S.C. § 103 as allegedly unpatentable over the combined disclosures of U.S. Patent No. 6,486,037 to Norcott et al. ("Norcott"), U.S. Patent No. 6,566,734 to Sugihara et al. ("Sugihara"), U.S. Patent No. 5,468,657 to Hsu ("Hsu"), and U.S. Patent No. 6,064,092 to Park ("Park") Claims 3 and 9 stand rejected as allegedly unpatentable under 35 U.S.C. § 103 over the combined disclosures of Norcott, Sugihara, Hsu, Park and U.S. Patent No. 6,417,078 to Dolan et al. ("Dolan et al."). Claim 27 stands rejected under 35 U.S.C. § 103 as allegedly unpatentable over the combined disclosures of Norcott, Sugihara, Hsu, Park and U.S. Patent No. 6,465,290 to Suguro et al. (" Suguro"). Claims 10-12, 20 and 24 stand rejected as allegedly unpatentable over the combined disclosures of Norcott, Sugihara, Hsu, Park and U.S. Patent Application Publication No. 2003/0186511 to Yiu et al. ("Yiu"). Claim 14 stands rejected under 35 U.S.C. § 103 as allegedly unpatentable over the combined disclosures of Norcott, Sugihara, Hsu, Park, Yiu and U.S. Patent No. 6,162,677 to Miyakawa et al. ("Miyakawa"). Claims 15 and 21-23 stand rejected under 35 U.S.C. § 103 as allegedly unpatentable over the combined disclosures of Norcott, Sugihara, Hsu, Park, Yiu, Miyakawa and U.S. Patent Application Publication No. 2002/0153587 to Adkisson et al. ("Adkisson"). Claims 16, 18 and 19 stand rejected under 35 U.S.C. § 103 as allegedly unpatentable over the combined disclosures of Norcott, Sugihara, Hsu, Park, Yiu, Miyakawa, Adkisson and U.S. Patent No. 6,001,706 to Tan ("Tan"). Claim 17 stands rejected under 35 U.S.C. § 103 as allegedly unpatentable over the combined disclosures of Norcott, Sugihara, Hsu, Park, Yiu, Miyakawa, Adkisson et al. and U.S. Patent No. 5,360,995 to Graas et al. ("Graas").

Claim 13 stands rejected under 35 U.S.C. § 103 as allegedly unpatentable over the combined disclosures of Norcott, Sugihara, Hsu, Park, Yiu and U.S. Patent No. 6,673,695 to Lim et al. ("Lim"). Claim 25 stands rejected under 35 U.S.C. § 103 as allegedly unpatentable over the combined disclosures of Norcott, Sugihara, Hsu, Park, Yiu and U.S. Patent No. 6,110,779 to Yang et al. ("Yang et al.").

Applicants respectfully submit that the claims of the present application are not rendered obvious by any of the references cited by the Examiner in the present Office Action. Specifically, none of the applied references teach or suggest the claimed method of forming a thin channel MOSFET which includes, among other steps, a step of providing ***a localized oxide region*** in said SOI layer and ***on top of, and in contact with, an upper surface of said buried insulating layer,*** wherein said localized oxide regions thins a portion of said SOI layer to a second thickness that is less than said first thickness, ***said localized oxide region is self-aligned with said channel via*** and does not extend entirely across said buried insulating layer.

As such, the claimed method thins the SOI layer (a semiconductor layer on top of a buried oxide layer) by forming a localized oxide region 25 in the SOI layer 19 which is on top of, and in contact with, the buried insulating layer 13. See FIGS. 7, and 9-14 of the present application. The localized oxide region 25 does not extend over the entire surface of the underlying buried oxide and it thins the SOI layer from an initial first thickness to a second thickness, wherein said second thickness is less than said first thickness.

The principal reference in each of the ten obviousness rejections, i.e., Norcott, is defective since it does not teach or suggest the claimed step mentioned above. That is, Norcott et al. does not teach or suggest a method wherein ***a localized oxide region*** is formed in said SOI layer and ***on top of, and in contact with, an upper surface of said buried insulating layer,***

wherein said localized oxide regions thins a portion of said SOI layer to a second thickness that is less than said first thickness, said localized oxide region is self-aligned with said channel via and does not extend entirely across said buried insulating layer.

Norcott provides a method of forming a defect induced buried oxide region in a semiconductor substrate. Norcott does not disclose a localized oxide region that is on top of, and in contact with, an upper surface of a buried oxide layer. In other words, a structure corresponding to "a localized oxide region" as disclosed and claimed in Claim 1 of the present application does not exist in Norcott.

FIGS. 1(a)-1(b) show one embodiment of the prior art wherein a damaged region 12 and an amorphous region 14 are formed in a substrate 10 to subsequently form a continuous BOX region 16 in FIG. 1(b) (column 6, line 8 – 9 in Norcott) and 1(c) (column 6, lines 42- 53 in Norcott) or a buried oxide region 20 in FIGS. 1(d) (column 6, lines 56- 58 in Norcott). Applicants note that regions 12 and 14 are not oxides at this point of the prior art process, but instead the regions include oxygen ions. As such, they are appropriately labeled as "stable buried damaged region 12" (column 4, line 23 in Norcott) and "amorphous region 14" (column 5, line 24 in Norcott). After annealing, regions 12 and 14 are converted to buried oxide 16 which is located within the semiconductor layer 10. In the second embodiment of the prior art, Norcott et al. discloses that an intermediate structure FIG. 1(c) is formed that includes a highly defective Si layer 18 atop a buried oxide 16. The "highly defective Si layer 18" is not an oxide. FIG. 1(d) shows the annealed structure of FIG. 1(c) including a buried oxide 20. Applicants respectfully submit that Norcott does not teach or suggest the formation of a localized oxide region that is located on, and in contact with, a buried insulating layer, as presently claimed. In the embodiment where SOI substrates are used, the buried oxide is formed into one of the SOI

layers, but Norcott does not teach or suggest that the newly created buried oxide is in contact with the performed buried oxide region.

Applicants note that the Examiner identified an element in column 4, line 47 in Norcott as an equivalent structure to a localized oxide region. This passage refers to "the starting substrate" according to one embodiment with single or multiple buried oxide layers as exemplified in FIGS. 5(a) – 5(c) in Norcott. Examination of FIGS. 5(a) – 5(c) in Norcott reveal that none of the buried oxide regions 52 are adjoined to each other. Nor is there any suggestion that any two of the buried oxide regions should be adjoined to each other in Norcott. Since all of the buried oxide regions are separated from each other, none of the structures taught or suggested by Norcott fits the description of a localized oxide region, as claimed in Claim 1 of the present application. Therefore, Norcott does not teach or suggest the disclosed and claimed structures in the present application.

In addition to the principal reference discussed above, each of the ten rejections includes Sugihara as a secondary reference that is used in combination with Norcott. Applicants respectfully submit that Sugihara does not alleviate the defects mentioned above in Norcott since the applied secondary reference does not teach or suggest a step of providing the claimed localized oxide region that is on top of, and in contact with, the buried oxide. Sugihara describes a process of making a FET utilizing a replacement gate process. The description of Sugihara is silent in regard to forming a localized oxide within an SOI layer that thins the SOI layer, yet it is located on top of, and in contact with, a buried oxide layer. This feature, which is present in the claimed method, is absent from the disclosure of Sugihara.

In addition to the above references, each of the rejections cites Hsu for allegedly disclosing the claimed localized oxide region. Applicants respectfully disagree since Hsu does

not teach or suggest a localized oxide region in addition to a buried insulating layer. Instead, Hsu teaches a method of forming a buried insulating region 40 including nitrogen and oxygen, wherein the content of nitrogen is made higher in the interface regions 46 and 48 located between the overlying SOI layer 20 and the underlying substrate layer 44. See FIG. 3 of Hsu. A single buried insulating layer is thus described and illustrated in Hsu. Hsu does not teach or suggest a ***localized oxide region that is formed in an SOI layer and on top of, and in contact with, an upper surface of a buried insulating layer,*** *wherein said localized oxide regions thins a portion of said SOI layer to a second thickness that is less than said first thickness, said localized oxide region is self-aligned with said channel via and does not extend entirely across said buried insulating layer.* The above mentioned localized oxide region is not taught or suggested in Hsu and the Examiner has not properly indicated where Hsu teaches the presence of such a localized oxide region.

In addition to the above references, each of the rejections cites Park for allegedly disclosing the claimed localized oxide region. Applicants respectfully disagree since Park does not teach or suggest a step of providing a localized oxide region ***in said SOI layer*** and ***on top of, and in contact with, an upper surface of said buried insulating layer***, wherein said localized oxide regions thins a portion of said SOI layer to a second thickness that is less than said first thickness, said localized oxide region is self-aligned with said channel via and does not extend entirely across said buried insulating layer. According to Park, the structurally equivalent element to a localized oxide region in the present application is the center portion 50a of a field oxide region 50 (See FIG. 3(c)). The field oxide 50 and the center portion 50a are formed prior to deposition of SiO_2 deposition (column 3, line 53 – 58 in Park). After planarization, the combination of field oxide 50 and the deposited SiO_2 form a planarized electrically insulating

layer 60, a portion of which resembles a buried oxide layer only after bonding. Applicants note that at the time of formation of the center portion 50a, a buried oxide layer does not exist according to Park. According to Park, a localized oxide region cannot be formed in an SOI layer since an SOI layer does not exist at the time of formation of a localized oxide region, which is "a center portion 50a." Therefore, Park does not teach or suggest a ***localized oxide region that is formed in an SOI layer and on top of, and in contact with, an upper surface of a buried insulating layer,*** *wherein said localized oxide regions thins a portion of said SOI layer to a second thickness that is less than said first thickness, said localized oxide region is self-aligned with said channel via and does not extend entirely across said buried insulating layer.*

The remaining applied references, namely Dolan, Yiu, Adkisson, Lim, Miyakawa, Tan, Graas, Yang, and Suguro, do not alleviate the above defects in the combined disclosures of Norcott, Sugihara, Hsu, and Park. Applicants note in this regard that none of these other applied references teach or suggest a method including a step of providing a localized oxide that has the features recited in Claim 1 of the present application. Applicants further note in this regard that the Examiner has relied on each of the above-mentioned references as disclosing specific aspects of applicants' dependent claims. As such, Dolan, Yiu, Adkisson, Lim, Miyakawa, Tan, Graas, Yang, and Suguro are further removed from the processing steps recited in Claim 1 than is the combination of Norcott, Sugihara, Hsu, and Park.

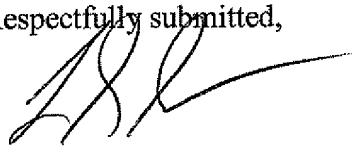
The various §103 rejections also fail because there is no motivation in the applied references which suggest modifying the disclosed methods to include the step of forming the localized oxide having the structural relationship to the buried insulating layer and the overlying SOI layer as recited in the claims of the present invention. Thus, there is no motivation provided in the applied references, or otherwise of record, to make the modification mentioned above.

"The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." In re Vaeck, 947 F.2d, 488, 493, 20 USPQ 2d. 1438, 1442 (Fed.Cir. 1991).

The rejections under 35 U.S.C. §103 have been obviated; therefore reconsideration and withdrawal thereof are respectfully requested.

Thus, in view of the foregoing amendments and remarks, it is firmly believed that the present case is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,



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